3. PROCESS OVERVIEW

3.1 Excavation Coordinates

In an effort to document the location of each bucket of waste retrieved from within the excavation site and to maintain an even grade at a specified depth, the project will use a bucket position monitor in concert with visual marks along the perimeter of the excavation site. The bucket position monitor (OCALA depth monitor) provides the horizontal (reach) and vertical (depth) displacement of the bucket tip, while visual marks along the excavation site perimeter (as shown in red on Figure 11) provide the angle at which the boom swing arc is positioned. Using the horizontal, vertical, and angle coordinates for each bucket full of waste, Stage I probing data and this project's sampling data could be correlated with the location of waste in the pit. In an effort to tie the retrieval location grid to the plane coordinate system for the State of Idaho, the zero point location for the OCALA depth monitor will be surveyed using the RWMC site-specific coordinate system for the INEEL. The operators will keep track of each scoop of waste by recording the scoop location (i.e., Section 1, Scoop 3, reach, depth, angle). The recorded scoop number will then be correlated to the cart number in which it dumps (which should be a 1:1 correlation). The cart number will then be correlated to the drum number in which the waste was packaged. Finally, the drum numbers are correlated to the sample numbers (including sample compositing).

In the event of a bucket position monitor failure, visual marks along the sides of the excavation site (as shown in blue on Figure 11) provide the distance out from the apex of the excavation site. This enables the operator to circumvent the depth monitor and provide a two-dimensional excavation site retrieval location grid. A third depth dimension can be added through various means (such as depth indicator marks on boom or depth triangulation based on landmarks). The depth monitor will be repaired/replaced if failure occurs during overburden excavation due to the critical nature of maintaining a 3-ft depth during overburden removal.

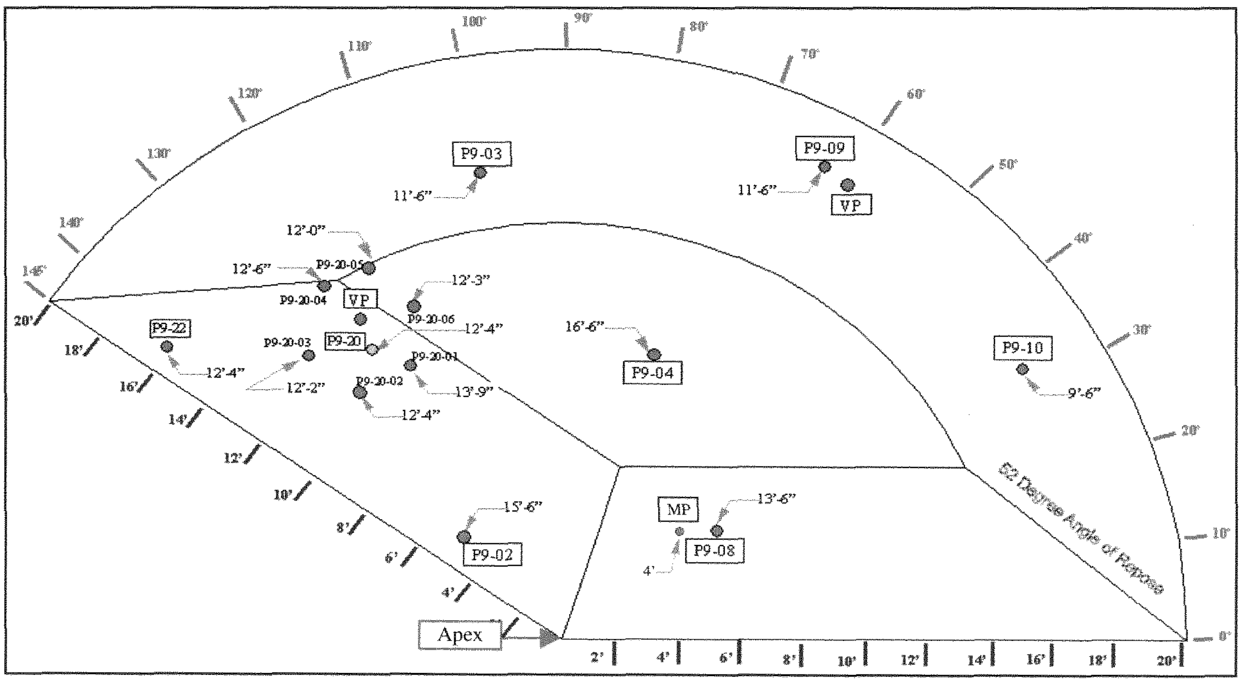

Figure 11. Excavation site reach and angle indicators.

3.2 Pre-Excavation and Overburden Excavation

3.2.1 Pre-Excavation

Before retrieval operations (and potentially before placement of the shoring box), using radiological control technician (RCT) support, the project will replace all existing probe caps with probe lifting caps that have a flexible cable and ball on which the clamshell bucket can grasp (see Figure 12). At this time, the project plans to mark the ground level on the probes to provide a visual representation of excavation depth in the event of depth monitor failure during waste excavation. In addition, perimeter marks (angle from right-hand corner = red and distance from excavator = blue) will be placed on the perimeter and sides of the excavation.

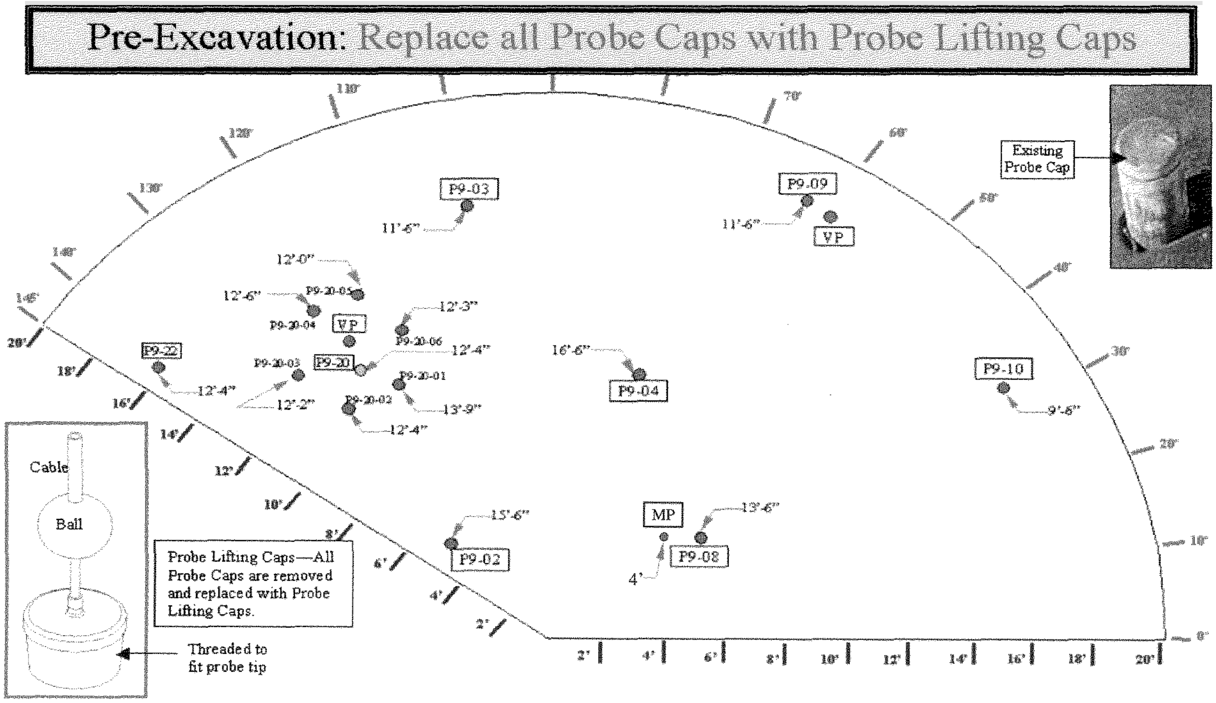

Figure 12. During pre-excavation, all probe caps will be replaced with probe lifting caps.

3.2.2 Overburden Excavation

3.2.2.1 First Step of Overburden Excavation. Workers and RCTs enter the RCS in appropriate personal protective equipment (PPE) to manually excavate the areas that will be hard to reach with the excavator (e.g., cluster of probes). By removing this overburden before beginning waste retrieval activities, it will not be contaminated and therefore will reduce waste stream volume. In addition, this will reduce the amount of overburden sloughing that will occur during waste excavation around the P9-20 probe and will assist deactivation, decontamination, and decommissioning (D&D&D) efforts by providing head room for new overburden. Manual excavation will proceed to a depth of 2 ft or until the hard pan is reached (see Figure 13). Excavated overburden can either be thrown directly into the bucket or onto the excavation site surface where the excavator can reach—whichever Operations prefers. Operations can lay plywood platforms on the excavation site and use the platforms to dig from if they desire additional protection from subsidence. A rough estimate of the manually excavated material is 120 ft^3 or about two soil sacks. The RCT monitoring will be performed per the instructions in Section 4.1.2. Periodic monitoring for volatile organic compounds (VOCs) or particulates may also be performed during overburden removal, as determined appropriate by the industrial hygienist.

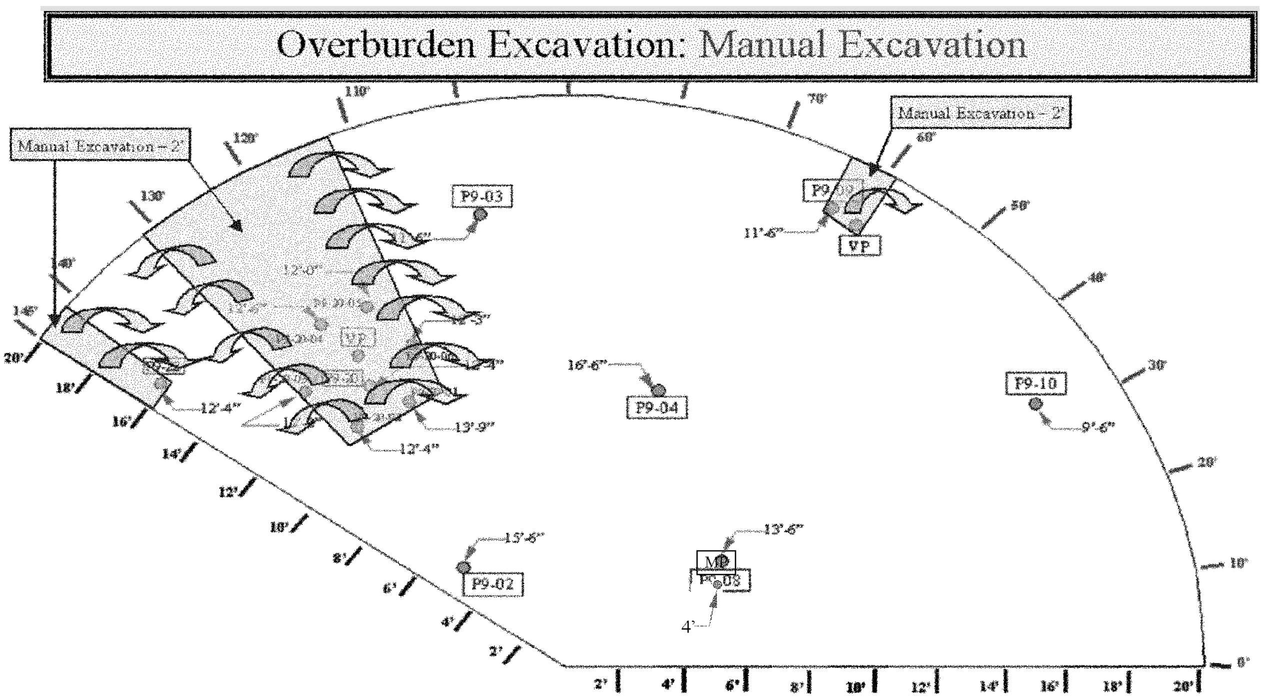

Figure 13. Manual excavation of overburden.

3.2.2.2 *Second Step of Overburden Excavation.* Next, working right to left, the backhoe will remove overburden to a depth of 2 ft across the entire dig area (as shown in Figure 14). This ensures efficient retrieval operations while reducing the risk that waste will be contacted for the first half of the overburden removal process. The RCTs in the RCS will perform periodic surveys of the backhoe bucket and soil sacks/boxes to determine if there is a contamination problem. At a minimum, the RCTs will survey the bucket and/or soil sacks between filling one sack and the start of the next (additional surveys are based on the RCT's judgment). Other workers can enter as necessary (or be stationed inside) to close and prepare the sacks for removal. Periodic monitoring for VOCs or particulates may be performed during overburden removal, as determined appropriate by the industrial hygienist.

NOTE: If the 4-ft-deep moisture probe falls over during this phase of overburden removal, it is pushed out of the way so as not to impede overburden removal.

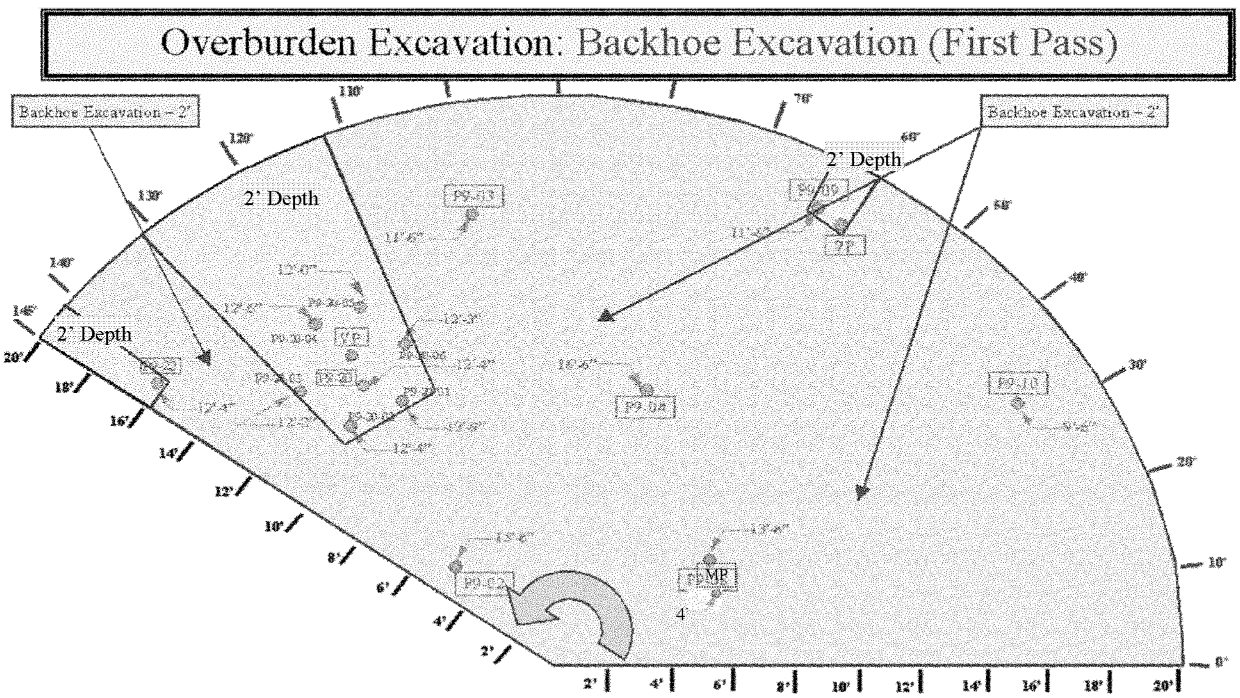

Figure 14. Backhoe excavation of overburden (first pass).

3.2.2.3 ***Third Step of Overburden Excavation.*** Next, working from right to left, the backhoe will remove the last of the overburden, per Section 4.1, across the entire accessible dig face area (as shown in Figure 15). The RCTs in the RCS will perform more frequent surveys of the backhoe bucket and soil sacks/boxes to determine if there is a contamination problem. At a minimum, the RCTs will survey the bucket and/or soil sacks between filling one sack and the start of the next (additional surveys are based on the RCT's judgment). Other workers can enter as necessary (or be stationed inside) to close and prepare the sacks for removal. Periodic monitoring for VOCs or particulates may be performed during overburden removal, as determined appropriate by the industrial hygienist.

NOTE: If the 4-ft-deep moisture probe falls over during this phase of overburden removal, it is pushed out of the way so as not to impede overburden removal.

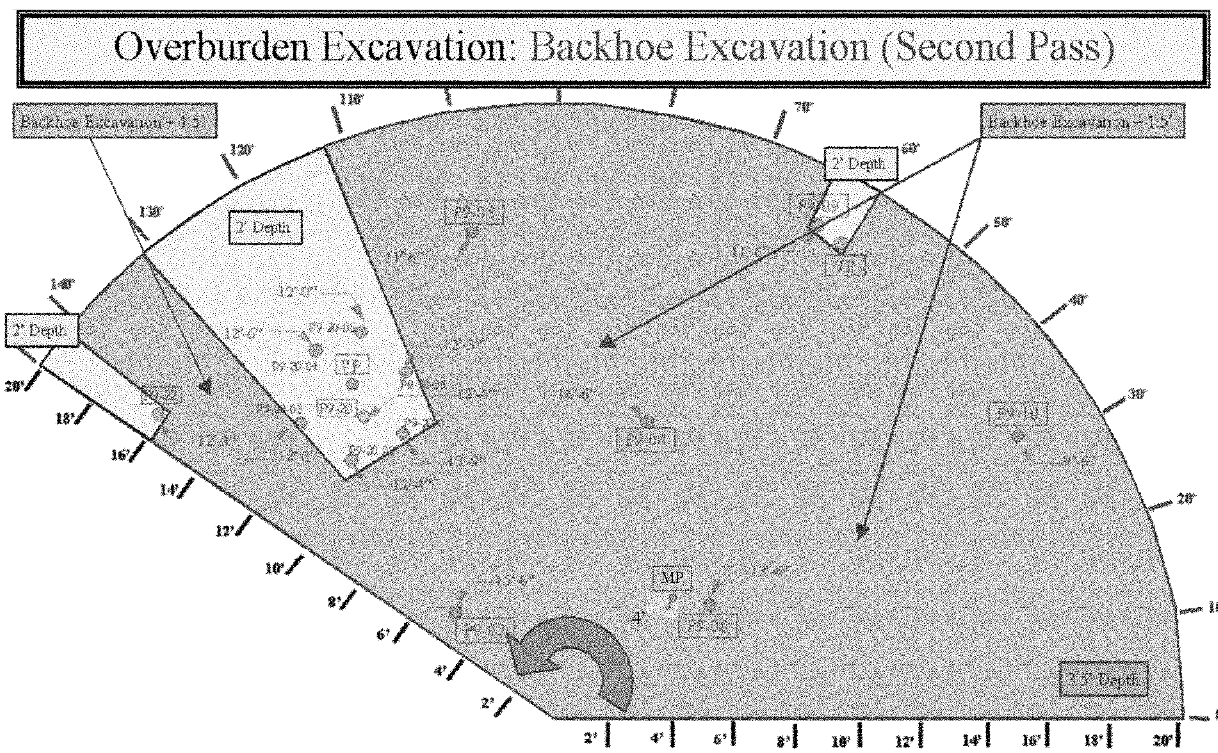

Figure 15. Backhoe excavation of overburden (second pass).

3.3 Waste Excavation/Core Sampling/Probe Removal

The project plans a staged excavation/core sampling/probe removal campaign in an effort to develop a methodology encompassing waste excavation, core sampling of the underburden, and removal (or relocation) of obstructive probes. The staged excavation method will segment the excavation site into three sections encompassing the majority of the excavation zone. Section 1 excavates approximately one-half of the total pit volume and core samples the underburden within this section. Section 2 removes the remaining balance of the waste zone material to be removed and core samples the underburden within this section. Section 3 exposes the underburden in proximity of the P9-20 probe for sampling. All of the required underburden core sampling is performed within these sections.

NOTE: Before excavation of Section 1, the moisture probe will be positioned within the pit so as not to impede excavation of Section 1.

3.3.1 Section 1

Figure 16 presents a schematic of the first excavation area (Section 1) within the excavation site. Section 1 entails a four-step process. First, a section of the waste zone, extending from the southwest corner of the excavation site to the dark-green line depicted in Figure 16, is excavated to an underburden depth of 11 ft or until the waste zone is no longer visually present. Second, following waste excavation, the area of exposed underburden is core sampled. Third, after the underburden core samples are taken in this location, the P9-04 probe is pulled from its exposed location. Fourth, the P9-04 probe and the moisture probe are stacked within the southwest corner of the excavation site.

Figure 16 presents two scenarios for the Section 1 border that extends from the excavation site apex through the P9-04 probe to the excavation site perimeter. The first assumes that the backhoe can cut a vertical waste wall within the excavation site. This first scenario is preferred by the project and is simply shown as a dark-green line. The second scenario assumes that the backhoe cannot cut a vertical wall (wastes will self-slough to an angle of 52 degrees) and is shown bordered by a light-green dashed line.

3.3.2 Section 2

Figure 17 presents a schematic of the second excavation area (Section 2) within the excavation site. The second of the three sections entails a four-step process similar to Section 1.

3.3.3 Section 3

Figure 18 presents a schematic of the third excavation area (Section 3) within the excavation site. The third and last section entails a two-step process similar to Sections 1 and 2 with the exception of probe removal. Section 3 permits underburden core sampling next to the P9-20 probe with minimal disturbance to the underburden.

Underburden sampling in the vicinity of the P9-20 probe is not a specific project objective; however, it is desirable. Sampling the underburden next to the P9-20 probe requires a systematic approach. Probe P9-20 is surrounded by a tight cluster of seven probes and is buried within the waste angle of repose that extends from the shoring box to the underburden. Removal of all of the surrounding probes (P9-20-vis, P9-20-01, P9-20-02, P9-20-03, P9-20-04, P9-20-05, and P9-20-06) in concert with waste excavation down to the underburden followed by core sampling next to the P9-20 probe is not an option due to the interference of the surrounding probes. Core sampling next to P9-20, following removal of the probe cluster surrounding P9-20, could generate erroneous underburden core sampling results due to the underburden tilling effect created by lifting a densely packed probe cluster out of the underburden. To access the area of underburden around the P9-20 probe, a minimum number of probes must be removed. In addition, as shown in Figure 18, Operations must cut an alcove of underburden into the angle of repose in the proximity of the P9-20 probe cluster. This underburden alcove allows core sampling to be taken next to the P9-20 probe without requiring the core sample to penetrate through the reposed waste zone. In other words, an effective P9-20 underburden core sample might be achieved by:

1. Removing one of the P9-20 probe cluster's probes (P9-20-01)
2. Reaching into the probe cluster through the created opening
3. Excavating down to the underburden within the probe cluster opening
4. Core sampling near the P9-20 probe.

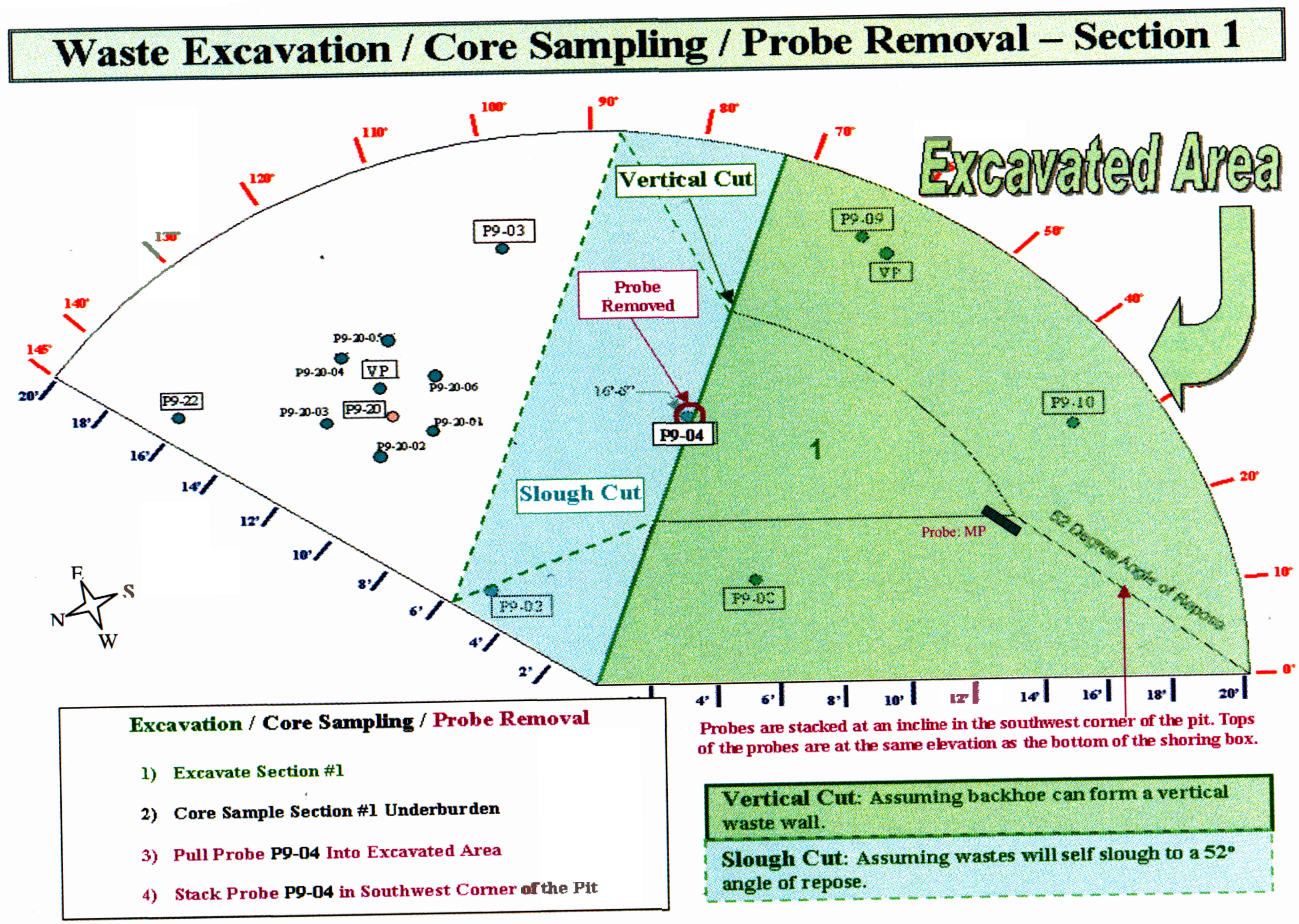

Figure 16. Waste excavation/core sampling/probe removal—Section 1.

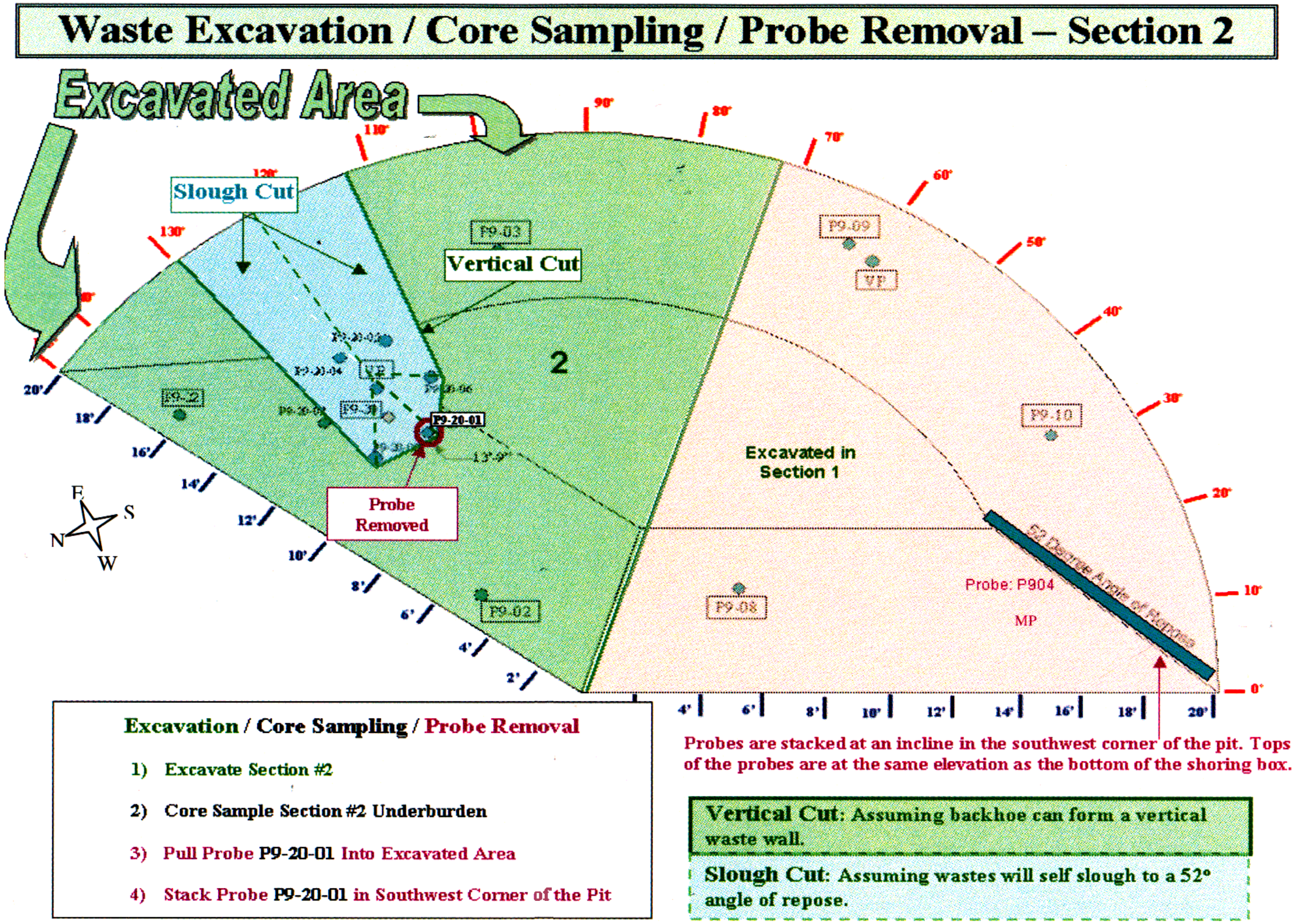

Figure 17. Waste excavation/core sampling/probe removal—Section 2.

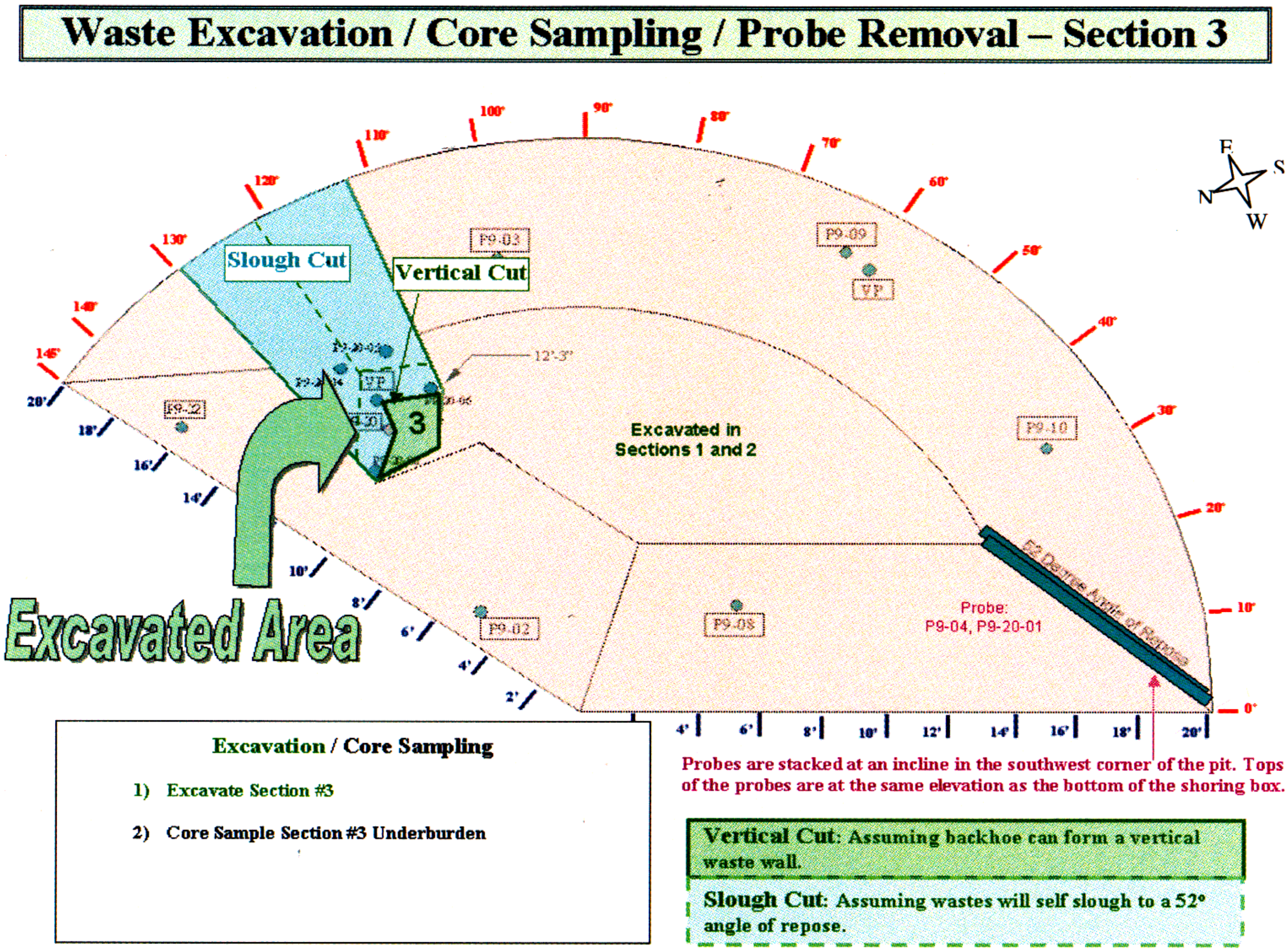

Figure 18. Waste excavation/core sampling/probe removal—Section 3.